

Descriptions of Typical Southern California Estuarine Ecosystems

Ballona Wetlands Design Charrette November 18, 2006

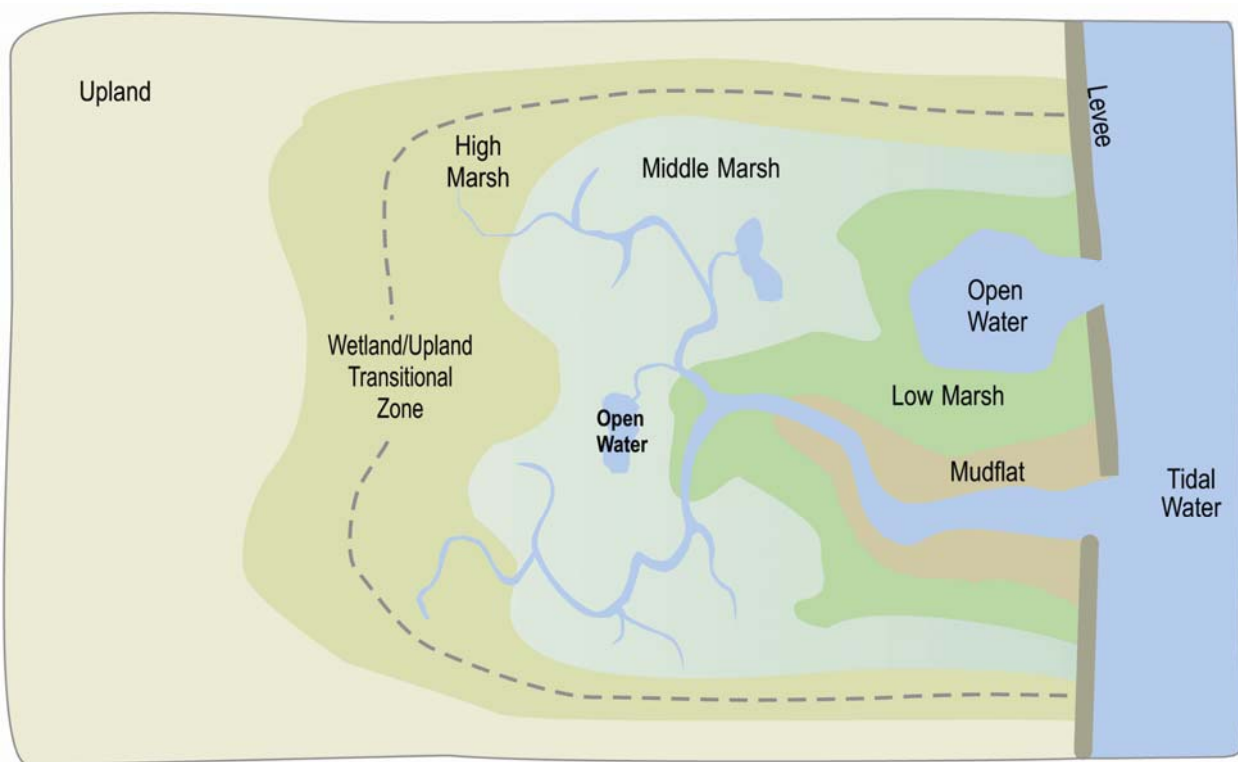
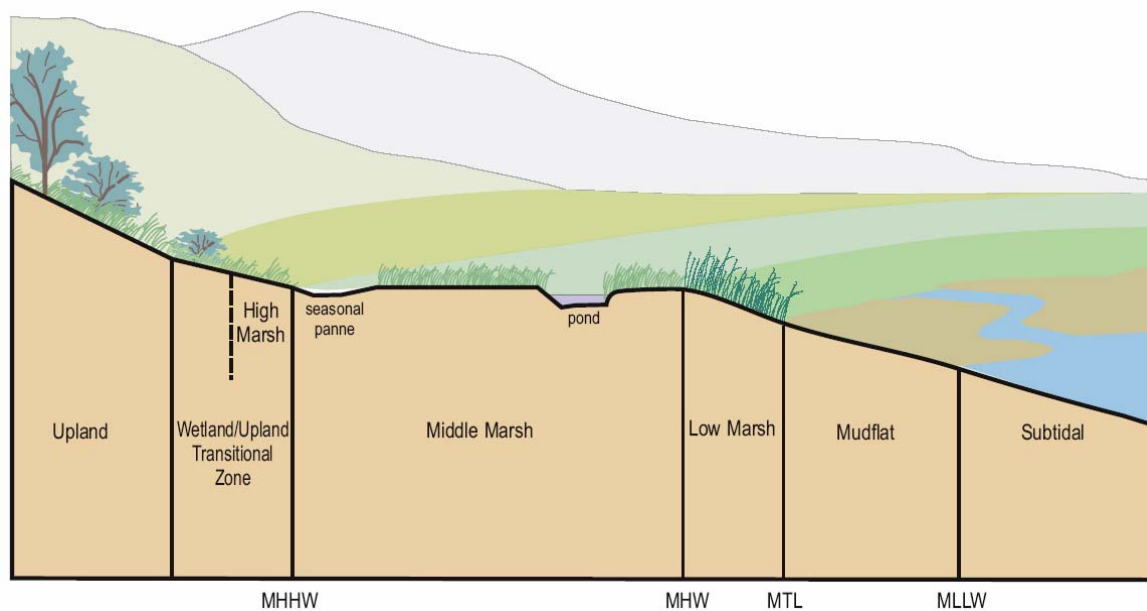
INTRODUCTION

A number of broad habitat types are identified in the Alternative Concepts: uplands, tidal wetlands, subtidal deepwater habitats including open water areas, freshwater marsh, riparian scrub, and seasonal wetlands. Each broad habitat type is made up of one or more components. For example, the upland habitat type would generally include coastal scrub and grasslands. The tidal wetland habitat type includes intertidal channels, mudflats, and low, middle and high marsh and transition zone. Each component is necessary to recreate the Ballona Ecosystem and without it the estuarine wetlands within the system would not function properly. Some components are currently absent from Ballona but could be created in the future.

The structure of the components (their composition, location, and extent) can vary somewhat and will be refined as the project progresses. To facilitate the discussion at the Charrette, we have provided the following generic descriptions of these habitat components showing what is generally typical of southern California and what may be possible to create, restore, or enhance at Ballona in the future. These descriptions are not intended to be detailed specifications, but serve solely to educate and provide background for our discussions. They are not intended to be detailed scientific descriptions, but rather characterize the various habitats.

More detailed descriptions of these habitats and the flora and fauna of the Ballona area, along with specific species lists are included in the Draft Ballona Wetland Existing Conditions Report, available on the Coastal Conservancy website. We also invite you to add additional species observations by using the Plant and Wildlife Observation form on that site. The address of the site is <http://www.coastalconservancy.ca.gov/Ballona/>.

Given the estuarine location of the site, the degree of tidal inundation will be a major factor in influencing the habitat type. The period, depth, and frequency of inundation by tidal water are dependent upon the tidal range, density of soil, degree of slope, and the elevation of the ground. This interaction of inundation, soil, slope, and elevation commonly leads to distinctive habitat profiles and planviews as shown below:



UPLANDS

Most of the peripheral uplands of estuaries have been disturbed in southern California. Historically, upland communities of the systems were likely comprised of coastal scrub, dunes, or grasslands, and woodlands in some cases.

Coastal Scrub. Coastal sage scrub can be described as low, soft to woody shrubs and subshrubs that occur in a variety of situations and are characterized by a variety of dominant plant species. Coastal Sage Scrub is now generally rare along the coast. This vegetation community is typically dominated by coastal sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*), together with laurel sumac (*Malosma laurina*), white sage (*Salvia apiana*) and others. Coastal Bluff Scrub, which includes types influenced by salt spray includes some of the same species as Coastal Sage Scrub as well as other species such as sea cliff buckwheat (*Eriogonum parvifolium*), quail bush (*Atriplex lentiformis*), and giant coreopsis (*Coreopsis gigantea*). Other forms of upland coastal scrub include, for example, Delta Scrub and Baccharis Scrub, which can be transitional to wetland scrub types.



A variety of terrestrial animals, including amphibians, reptiles, mammals and birds are supported by coastal scrub habitat. For instance, Coastal Sage Scrub is the preferred breeding habitat of the coastal California gnatcatcher (*Ptiliophila californica californica*).

Coastal Dunes. Dune habitat represents a form of transition zone between the land and the sea and includes Coastal Dune Scrub and Dune Herb vegetation. Coastal dune habitats have been largely lost due to development in southern California. Prior to development, plant species such as dune lupine (*Lupinus chamissonis*), mock heather (*Ericameria ericoides*), dune primrose (*Camissonia cheiranthifolia*), sand verbena (*Abronia maritima*) and dune ragweed (*Ambrosia chamissonis*) stabilized the loose sand, and the dunes were thereby anchored. Following human disturbance, many of the native plants were eliminated and exotics, such as sour-fig (*Carpodotus edulis*) and sea rocket (*Cakile maritima*) invaded or were planted.



Dunes are important habitats for several species of rare insects including globose dune beetle (*Coelus globosus*), the sandy beach tiger beetle (*Coelus hiticollis gravida*), and sand dune tiger beetle (*C. latesignata latesignata*). The coast horned lizard and silvery legless lizard (*Anniella pulchra pulchra*) once thrived here, and the latter still occurs within the Ballona Ecosystem. The endangered California least tern (*Sterna antillarum browni*) and western snowy plover (*Charadrius alexandrinus nivosus*) are associated with dune habitat but generally nest in the upper beach environment.

Grasslands. Grasslands were likely a common upland vegetation associated with estuarine ecosystems. Native perennial grasslands were likely dominated by purple needlegrass (*Nassella pulchra*). Existing conditions within coastal ecosystems often include extensive areas of annual grassland and forblands generally dominated by introduced species. The function and importance of perennial and annual grasslands, however, are often similar for the support of small mammals and the raptors that prey upon them.

WETLAND TRANSITION ZONE

Transition Zone. The transition zone represents that area where the halophytic (salt-tolerant) and hydrophytic salt marsh vegetation overlaps with upland communities.



At relatively undisturbed southern California estuaries, the scrub-shrub plant species of the transition zone may include boxthorn (*Lycium californicum*), bush seepweed (*Suaeda maquinii*), and quail bush. These overlap with the highest of the salt marsh species including, for example, saltgrass (*Distichlis spicata*), alkali weed (*Cressa truxillensis*), and shoregrass (*Monanthochloe littoralis*).

The animals at the higher elevations of the transition zone are primarily terrestrial species. Those associated with shrubby uplands such as portions of the transition zone include, for example, various species of snakes, lizards, small mammals and birds. Herpetofauna may include California kingsnake (*Lampropeltis getulus californiae*), gopher snake (*Pituophus melanoleucus annectens*) and side-blotched lizard (*Uta stansburiana*). Common mammals of the shrub-dominated uplands include western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), gopher (*Thomomys* spp.), opossum (*Didelphis virginianus*), striped skunk (*Mephitis mephitis*), and California ground squirrel (*Spermophilus beechyi*). The small mammals are preyed upon by a variety of birds including short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), and white-tailed kite (*Elanus caeruleus*).

The transition zone may also include nontidal palustrine habitats both salt influenced and non-saline types. Seeps from perched water tables on deltas and the toe of slopes and along dune transitions often support a variety of palustrine emergent and scrub-shrub types. Characteristic non-saline or slightly brackish species may include shrubs such as mule fat (*Baccharis salicifolia*) and herbaceous species such as spiny-rush (*Juncus acutus*), willow-dock (*Rumex salicifolia*), and alkali ryegrass (*Leymus triticoides*). Seasonal wetlands also occur in this area, especially in low-gradient deltaic deposits and may include salt-influenced types supporting a variety of native annual species such as alkali barley (*Hordeum depressum*) and salt marsh daisy (*Lasthenia glabrata* var. *coulteri*).

ESTUARINE WETLANDS

Intertidal salt marsh ranges from low marsh, dominated by California cordgrass (*Spartina foliosa*), to a diverse mosaic of species that comprises the mid-marsh, to very high marsh species that transition to upland. Salt marsh vegetation changes gradually with elevation. Nearly every species has its peak occurrence at its unique elevational band and the vegetation forms a continuum rather than a set of zones. However, the presence of shrub-like succulents at the uppermost elevations and tall cordgrass at the lowest elevations helps to delineate high to low marsh.

High Marsh. High marsh habitats are irregularly to intermittently inundated by tidal water and generally range from saline to hypersaline conditions. Plants that comprise the high marsh include the perennial glasswort (*Arthrocnemum subterminale* = *Salicornia subterminalis*), shoregrass, alkali heath (*Frankenia salina*), and sea lavender (*Limonium californicum*). The vegetation varies depending on the density of the soil (i.e., ratio of clay to sand), which often is correlated with salinity. Vegetation in dense, hypersaline (salinity greater than seawater) or euryhaline (fluctuating salinity) is quite different than loose, sandy soils. The endangered salt marsh bird's beak (*Cordylanthus* ssp. *maritimus*) occurs in high marsh, where it is more abundant in the sandy soils. High marsh vegetation provides habitat for Belding's savannah sparrow, staphalinid beetles, the snail genus *Assiminea*, and other estuarine restricted species.



Mid-Marsh. Intermediate elevations within the salt marsh are also inundated irregularly by tides but at a greater frequency than are higher elevations. As a result, the plant species that inhabit this elevation are adapted to occasional prolonged inundation. The dominant plant is pickleweed (*Salicornia virginica* = *Sarcocornia pacifica*) a perennial with the broadest elevation range of all salt marsh species. Other common mid-marsh species include saltwort (*Batis maritima*), arrowgrass (*Triglochin concinnum*), sea-blite (*Suaeda esteroa*), and jaumea (*Jaumea carnosa*).



The animals of the mid-marsh are abundant and diverse. Food is abundant in the form of algae and the insects that feed on algae. Animals that feed directly on algae include Ephydrid flies, amphipods, and snails such as *Melampus* sp. and California horn snail (*Cerithidea californica*). A variety of birds forage in the mid-marsh including willet (*Catotrophorus semipalmatus*), marbled godwit (*Limosa fedoa*), long-billed curlew (*Numenius americanus*), great blue heron (*Ardea herodias*), and great egret (*Ardea alba*). The state endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) inhabits the mid-marsh where it prefers to nest in pickleweed in mid and high marsh conditions

Low Marsh. Low salt marsh is regularly inundated by tides and is dominated by California cordgrass that forms dense monotypic stands. At its lower elevation, cordgrass intergrades with mudflat habitat; at its upper elevation it integrates with a mosaic of mid-marsh species. This highly productive species decomposes to form the base of the detrital food chain that supports many lower order estuarine consumers.



Many of the animals of the low marsh are adapted to periods of frequent inundation. These

include California horn snail, lined shore crab (*Pacygrapsus crassipes*), yellow shore crab (*Hemisgrapsus oregonensis*), and fiddler crab (*Uca crenulata*). The best-studied animal of the low marsh is the federal and state-endangered light-footed clapper rail (*Rallus longirostris levipes*). This species generally nests in the cordgrass that grows in the low marsh and feeds on fishes and crustaceans, which inhabit the tidal creeks that convey tidal waters to the low marsh. It also nests in pickleweed in mid-marsh conditions and in bulrushes in brackish marsh vegetation.

Brackish Marsh. Sites where freshwater mixes with saline seawater produce brackish conditions with intermediate salinities. This phenomenon is less frequent in southern California where many estuaries are less influenced by runoff from rainfall than in more northerly latitudes. Local influence from seeps and springs and seasonally impounded stream and river-mouths can produce brackish environments that support emergent vegetation characterized, for example, by prairie bulrush [*Bolboschoenus (Scirpus) maritimus*], and southern cattail (*Typha domingensis*), and aquatic bed species including (*Potamogeton pectinatus*) and ditchgrass (*Ruppia* spp.).

Intertidal Channel Habitats. Intertidal channels and creeks play a critical role in salt marshes as they convey tidal waters and associated nutrients and dissolved gases. They also support a complex assemblage of plants and animals.



Estuarine channels and creeks are subjected to a wide variety of environmental conditions. Typically, tidal flushing is greatest at the tidal inlet and decreases with distance from the inlet. This general gradient, in turn influences, water movement, salinity, temperature, nutrients, and dissolved gases. These environmental factors influence the species composition, distribution, and population dynamics of the channel fauna.

SUBTIDAL DEEPWATER HABITATS

Subtidal deepwater habitats include channels, embayments, basins and other features, which at extreme low water do not drain with the outgoing tides. This estuarine water regime results in

permanently flooded habitats and permanent open water bodies. These habitats are generally considered truly aquatic systems and are adjacent to and downslope from tidal estuarine wetlands. Estuaries with extensive deepwater habitat areas often support extensive intertidal low marsh and mudflat habitats.



The plants of channels and creeks, both intertidal and subtidal, are generally dominated by non-vascular taxa, but under brackish conditions may include various aquatic bed and emergent vascular species. The non-vascular plants include phytoplankton and algae, which, along with the detritus from decomposed cordgrass, are often direct links in the estuarine food chain (i.e., are directly consumed by higher order consumers). Benthic invertebrates are the most visible consumers of detritus, algae and plankton. Crabs and snails graze on detritus and macroalgae, while bivalve molluscs filter feed on phytoplankton. Polychaete worms inhabit the fine sediments of tidal creeks, while fish exploit the water column and substrate surface. Channels are important foraging areas for birds from other habitats. Of note is the endangered California least tern (*Sterna antillarum browni*) which feed on fishes, primarily top smelt (*Atherinops affinis*) and northern anchovy (*Engraulis mordax*).

PALUSTRINE WETLANDS

Freshwater Marsh. Freshwater marshes occur in saturated, mineral-rich soils. The dominant plants are generally emergent monocots such as cattails (*Typha* spp.) and bulrushes [*Schoenoplectus* (*Scirpus*) *californicus*] while aquatic-bed species, such as pondweeds (*Potamogeton* spp.), are also common. Redwing blackbirds (*Agelaius phoeniceus*) and marsh wrens (*Cistithorus palustris*) commonly breed in the tall, dense vegetation. Common mammals include raccoon (*Procyon lotor*), striped skunk and opossum. Freshwater marsh habitat may also support the light-footed clapper rail, although this is not considered optimal breeding or foraging habitat. These marshes may provide refugia for rails and other bird species during extreme high tides.



Creation and maintenance of freshwater marsh habitat is dependent upon a constant source of freshwater. Some coastal wetland restoration plans have incorporated freshwater and brackish marshes due to historic evidence of springs adjacent to intertidal areas.

Riparian Scrub. Willow scrub is characterized by dense broad-leaved, winter-deciduous riparian thickets dominated by several willow shrub and tree species (*Salix* spp.). Riparian trees also may occur with the association and may include, for example, scattered Fremont's cottonwood (*Populus fremontii*), and western sycamore (*Platanus racemosa*). Riparian woodland also may occur in small groves or in riverine corridors that drain into estuaries. As with other riparian habitats, riparian scrub supports a diverse assemblage of wildlife species, especially passerine bird species. The endangered least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Epidonax traillii extimus*) as well as other sensitive species, such as yellow warbler (*Dendroica petechia brewsteri*) and yellow-breasted chat (*Icteria virens*) all depend on riparian woodlands for breeding. Mammal assemblages are similar to those found in freshwater marsh habitats as the two often intergrade.



In an undisturbed estuarine system, willow scrub habitat would generally occur upstream of tidal influence as willows are very sensitive to salt. Like freshwater marsh, this habitat is dependent upon a constant source of freshwater.

Seasonal Wetlands. Seasonal wetlands are non-tidal wetlands and transitional habitats that are flooded to varying degrees by seasonal rainfall and runoff. If there are sufficient salts in the soil, the seasonal wetland may support plant species more typical of coastal salt marsh, such as pickleweed, saltgrass and alkali weed (*Cressa truxillensis*). If the soils do not contain salts or alkaline substances, the seasonal wetlands may support freshwater marsh species and a mixture of weedy opportunists. “Vernal pools” and saline vernal wetlands in transition zones can occur on alluvial and deltaic deposits adjacent to estuarine habitats and are known to support special concern plants and invertebrate animals.



Seasonal wetlands can be important to a number of bird species that feed on the insects, algae and aquatic invertebrates that develop in these temporary habitats. Amphibians, such as western toad (*Bufo boreas*) and Pacific tree frog (*Pseudacris regilla*) have been noted to breed in this habitat. These areas also attract mammals, such as coyote, raccoon, striped skunk and opossum. In areas where water pools deeply enough, waterfowl species such as mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*) and American coot (*Fulica Americana*) have been observed. Seasonal wetlands may also be used by killdeer (*Charadrius vociferus*) and black-necked stilts (*Himantopus mexicanus*).